

Application No.: 10/743,387

Docket No.: 21581-00314-US

REMARKS

Claims 1, 3, 5, 8, 10, 11, 15, and 17-24 are now in the application. Claims 2, 6, 7, 9, 12-14 and 16 have been cancelled without prejudice or disclaimer. Claim 1 has been amended to include recitations from claim 2, from claim 4 concerning the concentration of the zirconium, and/or titanium and/or hafnium. Claim 1 has also been amended to recite that the substance to be treated comprises "a plurality of metal materials among the iron material, the aluminum material and the zinc material" as disclosed, for example, at page 15, lines 5-9 of the specification. Claims 1, 3, 5, 10, 11 and 15 have been amended to recite "group" in place of "kind" for purposes of clarification and not to limit their scope. Claim 3 has been amended by deleting the superfluous phrase "as well as" for purposes of clarification and not to limit its scope. Claims 4 and 8 have been amended by deleting recitations that were inserted into claim 1 for purposes of clarification and not to limit their scope. New claims 17-24 are similar to claim 1 and claims dependent thereon except that claim 17 recites that the substance consisting of an iron material.

Claims 1, 2, 4, 7, 8 and 12 were rejected under 35 USC 103(a) as being unpatentable over WO99/14399 (referred to herein as WO'399). WO'399 does not render obvious claims 1, 2, 4, 7, 8 and 12.

The present invention as defined in claim 1 as amended provides a pretreatment method to be performed by one pretreatment step to articles including various metal materials such as iron, zinc and aluminum. To achieve this objective with a composition comprising zirconium, titanium or hafnium, the important problem to be solved is the adhesion strength of the metal surface and a coating film and the corrosion resistance after coating when applied to iron or zinc.

Namely, an important aspect of the present invention is to apply a composition comprising zirconium, titanium or hafnium to an iron or zinc surface.

Prior to the present invention, although it had been known that an aluminum surface could be treated by a composition comprising zirconium, titanium or hafnium, there was a problem with treating an iron material with such a composition, in that adequate adhesion of the metal with the coating film and the corrosion resistance after coating could not be attained. (see Line 25 of page 2 of present specification).

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The chemical properties of metal surfaces are very different when the metal element of the surface is different. Especially, the chemical properties of aluminum and iron differ quite significantly from each other. In view of these differences, compositions comprising zirconium, titanium or hafnium have been used for aluminum surface treatment but not used for zinc or iron surface treatment. For a long time, the surface treatment used for the zinc or iron has generally been with phosphate.

This is important background to keep in mind when comparing the present invention and the prior art. Considering such a background, the pretreatment method of aluminum surface could not be a favorable method for iron or zinc in many cases.

To apply a composition comprising zirconium, titanium or hafnium used for aluminum to an iron surface, would not be deemed appropriate by persons of ordinary skill in the art since that composition does not have good properties in corrosion resistance.

Namely, even when an aluminum surface could be treated by some composition, the result of the application of the identical composition to an iron or zinc surface could not be predictable to persons of ordinary skill in the art.

Claim 1, as amended, differs from WO'399, since the method of claim 1 requires that the substance or substrate being treated comprises a plurality of metal materials selected among iron material, aluminum material and zinc material. On the other hand, in WO'399, only aluminum is disclosed as the substrate to be treated. This difference is very important as it relates to objectives of the present invention as discussed above.

In addition, another difference is the content of components recited in the claims and WO'399. WO'399 suggests that the aminosilanes are generally available in an aqueous solution of from about 90% to 100%, by weight of the total unhydrolyzed aminosilane added to the solution. WO'399 further mentions that fluorine-containing inorganic compounds such as fluorotitanic acid, fluorozirconic acid, fluorohafnic acid and mixtures thereof are generally available in aqueous solutions of about 50% to about 60%, by weight. On the other hand, the treatment solution of the present invention preferably comprises from about 0.2% to about 3%, more preferably from about 0.2% to about 1%, by weight, of the aminosilane solution and preferably from about 0.1% to about 2%, more preferably from about 0.1% to about 0.5%, by weight, of the fluorine-containing inorganic compound solution; the remainder of the treatment solution is water (preferably deionized). In one preferred embodiment the treatment solution

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comprises about 5.25 g/l of an about 90%, by weight, aqueous solution of γ -APS (approximately 5.0 g/l γ -APS) and about 2.5g/l of an about 60%, by weight, aqueous solution of fluorotitanic acid (approximately 1.5 g/l fluorotitanic acid); the remainder of the solution is water (preferably deionized)."

It is clear that the content of the component, "at least one member selected from the group consisting of amino group-containing silane coupling agents, hydrolysates thereof and polymers thereof" is different from that of the present invention. In the present invention, amount of silane component contained in the composition is much less than that of WO'399.

Such a difference is due to the difference of the objects of these inventions. The object of WO'399 is to obtain a progressed corrosion prevention for aluminum but an object of the present invention is to provide a treating method for a substrate comprising a plurality of members of metal materials among the iron material, the aluminum material and the zinc material. For such different objects, the required amount of silane component is limited to different ranges.

For achieving the object of the present invention, it is the most important to progress the formation of coating on the iron or zinc surface. For such an object, the amount in claim 1 "a content of 50 to 500 ppm as a concentration of solid matter" is necessary.

This difference could not be predictable from the prior art. Therefore, the present invention is not obvious over the description of WO'399.

To further demonstrate the patentability of the present invention, see the attached Declaration under 37 CFR 1.132. In the declaration, compositions containing various amount of silane components were tested. Tests are performed for aluminum, zinc and iron.

From the results of these examinations, the importance of the amount of silane components is clearly demonstrated. Only the composition containing the silane components in the restricted amount in the present claim provides good results.

Claims 3, 5, 6, 9, 10, 11, 13, 14, 15 and 16 were rejected under 35 USC 103(a) as being unpatentable over WO99/14399 in view of U.S. Patent 6,193,819 to Wada et al. The cited references do not render obvious claims 3, 5, 6, 9, 10, 11, 13, 14 and 16. Wada et al do not overcome the above discussed deficiencies of WO'399 with respect to rendering unpatentable claim 1. Wada et al. was relied upon for a disclosure that accelerators including the claimed compounds can be used in conversion coatings to improve the effect of the coating upon a

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substrate. Accordingly, claims 3, 5, 6, 9, 10, 11, 13, 14 and 16 are patentable for at least those reasons as to why claim 1 is patentable.

New claims 17-24 relate to a pretreatment method for treating iron surface. As mentioned above, the composition used in the method of claim 1 has properties favorable for the application of an iron surface. Therefore, claim 17 and claims dependent thereon are not obvious over WO'399 and Wada at least for the same reason as to why claim 1 is patentable.

It is noted that references N, O and P cited by the examiner on form PTO-892 incorrectly state the Countries. The correct countries are WIPO, Europe and Europe, respectively. It is requested that a corrected PTO-892 be issued.

In view of the above, consideration and allowance are respectfully solicited.

In the event that the Examiner believes an interview might serve to advance the prosecution of this application in any way, the undersigned attorney is available at the telephone number noted below.

The Office is authorized to charge any necessary fees to Deposit Account No. 22-0185.

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Respectfully submitted,

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